Effects of rotational constraints on material efficiency of steel double-beam moment frame under seismic loading

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ABSTRACT

This study analytically assesses the performance of concrete panels used in underground double-beam floor systems subjected to earthquake loads. The lateral load analysis of concrete panels based on rotational constraints was quantitatively conducted using an idealized moment frame model with rotational springs. Seismic behavior influenced by rotational constraints was comparatively analyzed between prototype steel single moment frames and steel double-beam moment frames, focusing on inter-story drift ratios (IDR) and maximum moment demands. The steel double-beam moment frame incorporating concrete panels significantly decreased required steel quantities based on moment demand.
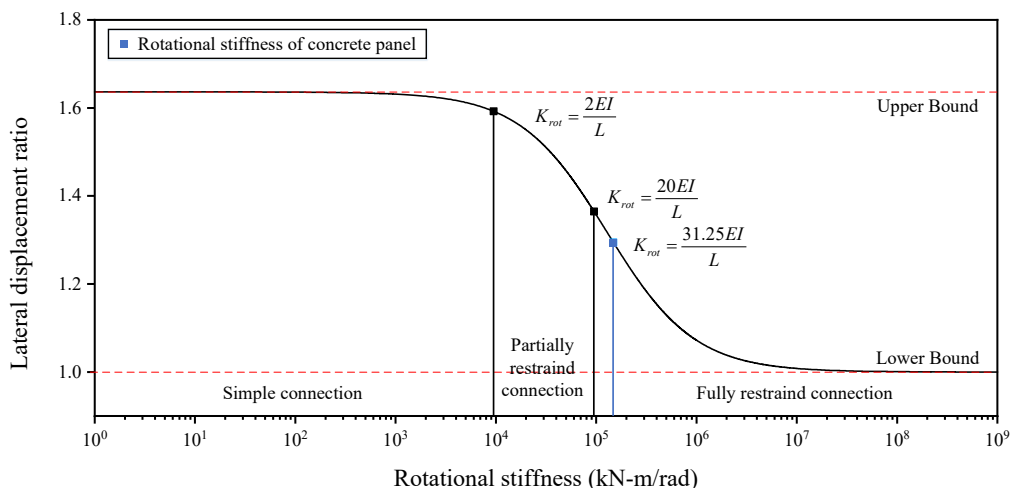
Fig. 1 Lateral displacement according to rotational stiffness

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